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Original Article *Özgün Araştırma*

A DEMOGRAPHIC ANALYSIS OF PATIENTS PRESENTING TO THE TERTIARY EMERGENCY DEPARTMENT BETWEEN THE FIRST RESTRICTION PERIOD AND THE FIRST NORMALIZATION PERIOD IN THE COVID-19 PANDEMIC

COVID-19 Pandemisinde İlk Kısıtlama Dönemi ile Birinci Normalleşmeye Geçiş Dönemi Arasında Üçüncü Basamak Acil Servise Başvuran Hastaların Demografik Analizi

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ABSTRACT

Objective: The COVID-19 virus has become a global threat by spreading all over the world. Countries are often unprepared for pandemics or other disasters, especially in the beginning, they experience organizational problems and the health system is adversely affected by this situation. The aim of this study is to analyze the patients who applied to the emergency department from the date of the first case in our country to the first day of the normalization process and to investigate the effects of different restraint decisions on the emergency patient characteristics.

Material and Methods: This study was carried out retrospectively on patients who applied to the emergency department of Kırıkkale University Medical Faculty Hospital between 11.03.2020 and 01.06.2020. During this period, the dates of the critical restriction decisions regarding the pandemic were determined, and the patients were divided into four different periods according to the time of admission. Period-I: Between 11 March and 21 March, Period-II: Between 21 March and 3 April, Period-III: Between 3 April and 4 May, and Period-IV: Between 4 May and 1 June. Demographic data, application forms, units for which consultation was requested, diagnoses and hospitalization status of all patients were recorded. Obtained data were evaluated with SPSS 22.0 program and $p<0.05$ value was considered significant.

Results: It was determined that 6507 patients applied to the emergency department during the study period. Period-I, n=1111; Period-II, n=723; Period-III consisted of n=2231 and Period-IV consisted of n=2442 patients. While the number of patient admissions was 78.39±28.46/day, 8.4% of them applied by ambulance. While 14.9% of all patients were infectious diseases emergencies, 17.3% were trauma. While simple traumas constituted 36.7% of the trauma patients, this was followed by falls and stab wounds. In Periods III and IV, the rate of stab wounds, blow and gunshot wounds increased. The highest number of consultations was requested from the Obstetrics and Gynecology clinic, followed by Internal Medicine and Cardiology. 14.8% of all patients were hospitalized and treated. The highest number of hospitalizations was in Internal Medicine, followed by Gynecology and Obstetrics and Cardiology.

Conclusion: As the pandemic process progressed, the rate of admissions by ambulance increased, and the characteristics of trauma cases changed. The application of pregnant patients to the hospital continued even during the pandemic.

Keywords: *Emergency Service, COVID-19, pandemic*

ÖZ

Amaç: COVID-19 virüsü tüm dünyaya yayılarak küresel bir tehdit haline gelmiştir. Ülkeler pandemi veya diğer afetler karşısında çoğu zaman hazırlıksız olup, özellikle başlangıçta organizasyon problemleri yaşamakta ve sağlık sistemi bu durumdan olumsuz etkilenmektedir. Bu çalışmanın amacı, ülkemizde ilk vakanın görüldüğü tarihten, normalleşme sürecinin başladığı ilk güne kadarki süreçte acil servise başvuran hastaları analiz ederek, alınan farklı kısıtlama kararlarının acil hasta karakteristiği üzerine etkilerini araştırmaktır.

Gereç ve yöntemler: Bu çalışma 11.03.2020 ile 01.06.2020 tarihleri arasında Kırıkkale Üniversitesi Tıp Fakültesi Hastanesi acil servisine başvuran hastalar üzerinde retrospektif olarak yapıldı. Bu dönem içerisinde pandemi ile ilgili alınan kritik kısıtlama kararlarına ait tarihler belirlenerek, hastalar başvuru zamanlarına göre dört farklı döneme ayrıldı. Dönem-I: 11 Mart – 21 Mart tarihleri arası, Dönem-II: 21 Mart – 3 Nisan tarihleri arası, Dönem-III: 3 Nisan – 4 Mayıs tarihleri arası ve Dönem-IV: 4 Mayıs – 1 Haziran arası dönemleri kapsıyordu. Tüm hastaların demografik verileri, başvuru şekilleri, konsültasyon istenen birimler, tanıları ve hastaneye yatış durumları kaydedildi. Elde edilen veriler SPSS 22.0 programı ile değerlendirildi ve $p<0.05$ değeri anlamlı kabul edildi.

Bulgular: Çalışma süresi içinde acil servise 6507 hastanın başvurduğu saptandı. Dönem-I, n=1111; Dönem-II, n=723; Dönem-III, n=2231 ve Dönem-IV, n=2442 hastadan oluşuyordu. Hasta başvuru sayısı 78.39±28.46/gün iken, bunların %8.4'ü ambulansla başvurmuştu. Tüm hastaların %14.9'unu ise Enfeksiyon hastalıkları acilleri oluşturmakta iken, %17.3'ünü travmaydı. Travma hastalarının %36.7'sini basit travmalar oluşturmakta iken, bunu düşmeler ve kesici-delici alet yaralanmaları takip etmekteydi. Dönem-III ve IV'te kesici-delici alet yaralanması, darp ve ateşli silah yaralanması oranı artmıştı. En fazla konsültasyon Kadın hastalıkları ve Doğum kliniğinden istenirken, bunu Dahiliye ve Kardiyoloji takip ediyordu. Tüm hastaların %14.8'i yatırılarak tedavi edildi. Yatış sayısı en fazla Dahiliye kliniğine iken, bunu Kadın hastalıkları ve Doğum ve Kardiyoloji takip ediyordu.

Sonuç: Pandemi süreci ilerledikçe ambulansla yapılan başvuruların oranının artmış, travma olgularını karakteristiği değişmişti. Gebe hastaların hastaneye başvurusu pandemide dahi devam etmişti.

Anahtar Kelimeler*: Acil servis, COVID-19, pandemi*

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INTRODUCTION

SARS CoV-2, otherwise known as the COVID-19 virus, spread rapidly to become a global threat, and was finally declared a 'pandemic' by the World Health Organization (WHO) on 11 March 2020 (1). By 1 June 2020, the COVID-19 virus had led to 6 million confirmed cases worldwide and more than 160,000 in Turkey, with more than 350 deaths worldwide and more than 4000 in Turkey by that date (2).

For that reason, as in the rest of the world, various restrictions were imposed in Turkey in order to prevent deaths caused by the disease and the spread thereof, to protect the public, and to avoid potential disruptions to the health system (3-6). These decisions were implemented by the government after 11 March 2020, when the first case was seen in Turkey (3-6). The restrictions first began being lifted on 1 June 2020, a date referred to as the 'first normalization' (3).

This study examined patient presentations to the emergency department between the beginning of the pandemic and the first normalization and investigated the effects of the restrictions imposed at different times on patient presentations.

MATERIALS AND METHODS

This retrospective study was performed with patients presenting to the Kırıkkale University Medical Faculty Hospital Emergency Department between 11 March and 1 June 2020. Approval was obtained from the Kırıkkale University Clinical Research Ethical Committee (no. 2021.05.03 dated 10.06.2021). The study was performed in strict compliance with the Good Clinical Practice guideline and the Declaration of Helsinki.

Establishment of the Study Groups

The patients included in the study were divided into four groups based on restriction measures implemented at different times between 11 March 2020, when the first case in Turkey was identified, and 1 June 2020, when restrictions began being lifted. • Period-I (partial freedom): The 10-day period between 11 and 21 March. Restrictions at this time involved suspension of face-to-face education/ teaching, sports matches being played without spectators, and special permission is required for overseas travel (4).

• Period-II (restriction on the elderly): The 14-day period between 21 March and 3 April. At this time a lockdown was in force that applied only to those aged 65 or over. In addition, ceremonies, celebrations, and condolences at which individuals come together in masse were also forbidden by restricting other citizens' visits to shopping malls, restaurants, cafeterias, etc. (5).

• Period-III (compulsory mask-wearing): The 31-day period between 3 April and 4 May. Mask-wearing was compulsory during this time. In addition, a lockdown was imposed on the population under 20, and entering and leaving large cities and the province of Zonguldak was forbidden (6).

• Period-IV (first normalization): The 29-day period between 4 May and 1 June. The lockdown imposed on individuals aged over 65 and under 20 was relaxed, and these were allowed to leave their homes at certain specific times (7).

Demographic data, presenting symptoms, internal and surgical problems, trauma records, the departments consulted, and hospitalization status were recorded for all patients. Trauma patients were additionally classified as Traffic accidents, Falls, Blows, Firearm injuries, Sharp object injuries, and Simple traumas (impact, sprains, etc.). Patients' records were accessed from the computer automation system. Patients aged under 18, without trauma, or with deficient records were excluded from the study.

Statistical analysis

The study data were analyzed on SPSS for Windows version 22.0 software (IBM Corporation, Armonk, NY, USA). Descriptive statistics were expressed as number (n), frequency (%), and mean plus standard deviation (±SD). The normality of distribution was evaluated using the Kolmogorov-Smirnov test. One-Way-ANOVA, Student's t test in two-way comparisons in case of normal distribution, and the Mann-Whitney U-test if the distribution was not normal were employed in comparisons between the groups. The chi-square test was applied in the comparison of qualitative data. The results were analyzed at a 95% confidence interval, with p values <0.05 being regarded as statistically significant.

RESULTS

A total of 6507 presented to the emergency department during the study period, 1111 in Period-I, 723 in Period-II, 2231 in Period-III, and 2442 in Period-IV. Mean daily numbers of presentations were 78.39±28.46 for the entire study period, 111.10±53.43 in Period-I, 55.62±11.24 in Period-II, 71.97±19.19 in Period-III, and 84.21±17.40 I Period IV.

Trauma patients represented 17.3%(n=1124) of all presentations. The highest rate of presentations among trauma patients was in Period-IV (19.1%) and the lowest in Period-II 12.6%). The rate of presentations in Period-IV was significantly higher than those in periods I and II (p=0.007 and <0.001, respectively), while no statistically significant difference was determined between periods III and IV (p=0.105) (Table 1).

The most frequent mechanism involved among the trauma presentations was simple traumas (36.7%), and the least frequent was firearms injuries (1.2%). The incidence of other trauma mechanisms (particularly sharp object and firearm injuries) increased during the pandemic (albeit not proportionally) and peaked in periods III and IV (Figure 1, Table 2).

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Table 1: Distribution of patient numbers during the pandemic periods

	Period-I (n=1111)	Period-II (n=723)	Period-III (n=2231)	Period-IV (n=2442)	Total (n=6507)
Type of presentation	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Trauma	174 (15.7)*	91 (12.6)†	393 (17.6)	466 (19.1)*,†	1124 (17.3)
Internal diseases	937 (84.3)	632 (87.4)	1838 (82.4)	1976 (80.9)	5383 (82.7)

*p=0.007; †p<0.001

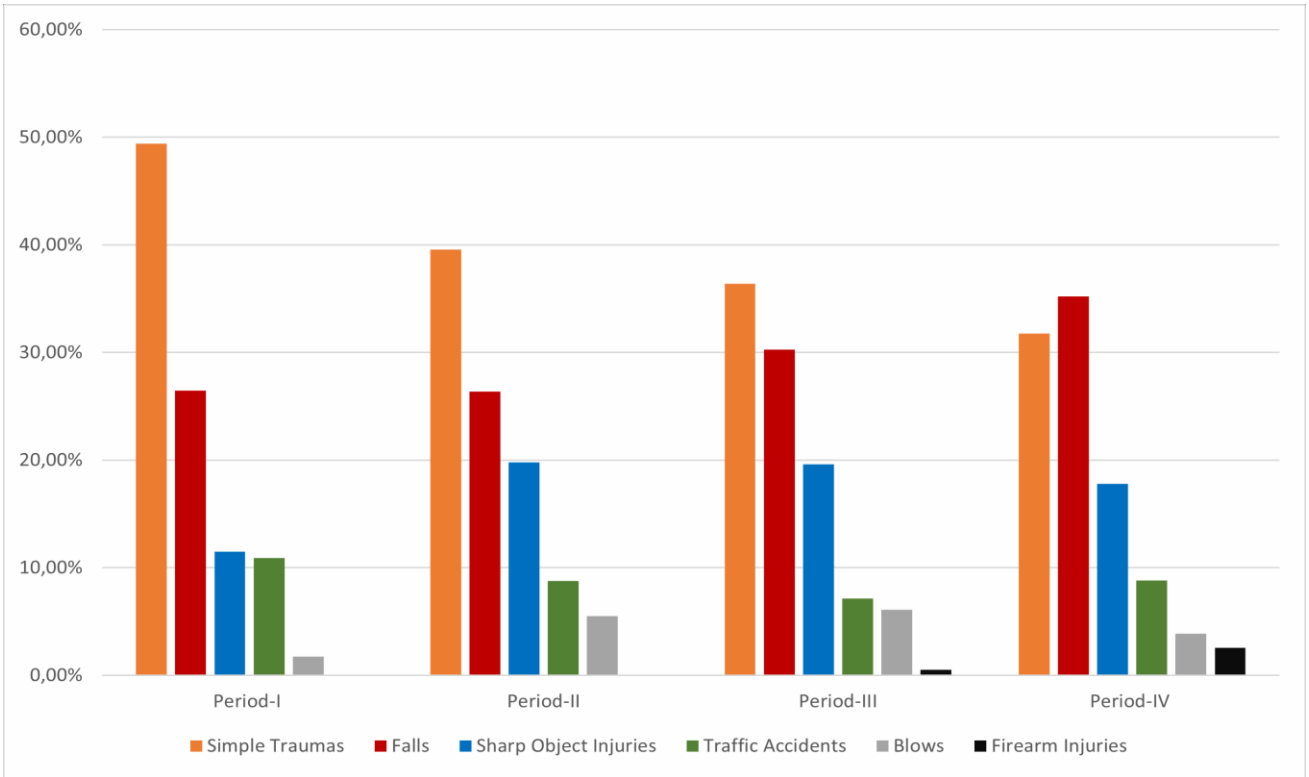

Figure 1: Distribution of trauma mechanisms according to the study periods.

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Table 2: Distribution of trauma mechanisms during the study periods.

	Period-I (n=174)	Period-II (n=91)	Period-III (n=393)	Period-IV (n=466)	Total (n=1124)
Type of trauma	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Simple traumas	86 (49.5)	36 (39.5)	143 (36.4)	148 (31.8)	413 (36.7)
Falls	46 (26.4)	24 (26.4)	119 (30.3)	164 (35.2)	353 (31.5)
SOI	20 (11.5)	18 (19.8)	77 (19.6)	83 (17.8)	198 (17.6)
Traffic accidents	19 (10.9)	8 (8.8)	28 (7.1)	41 (8.7)	96 (8.6)
Blows	3 (1.7)	5 (5.5)	24 (6.1)	18 (3.9)	50 (4.4)
FI	0 (0)	0 (0)	2 (0.5)	12 (2.6)	14 (1.2)

SOI: Sharp object injuries, FI: Firearm injuries

Analysis of disease diagnoses in the emergency department revealed that diagnoses most frequently involved traumatic, infectious diseases, and internal diseases (Gastroenterology, Nephrology, Oncology, and Endocrinology) emergencies. Infectious emergencies (including COVID-19) decreased from Period-I to Period-IV, while cardiac emergencies decreased in Period-II in particular but then increased. Diagnoses regarding gynecological, ENT, ocular, neurological, and psychiatric emergencies were the least frequent in all four periods, with a proportionally stable course in all periods (Figure 2).

Analysis revealed that 85.2%(n=5545) of patients presenting to the emergency department were discharged, while 14.8%(n=962) were hospitalized for treatment. The proportion of patients hospitalized for treatment increased as the pandemic progressed, with rates of 7.1% in Period-I, 14.7% in Period-II, 17.9% in Period-III, and 15.5% in Period-IV. The three clinics to which patients were most frequently admitted were Internal Medicine, Gynecology and Obstetrics, and Cardiology, and rates of admission to other departments also increased as the pandemic progressed (Table 3).

Table 3: Distribution of patients by departments during the study periods.

	Period-I (n=79)	Period-II (n=106)	Period-III (n=399)	Period-IV (n=378)
Department to which admitted	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Internal Medicine	16 (20.25)	21 (19.81)	86 (21.55)	113 (29.89)
Gynecology and Obstetrics	13 (16.46)	19 (17.92)	62 (15.54)	50 (13.23)
Cardiology	12 (15.19)	7 (6.60)	41 (10.28)	48 (12.70)
General Surgery	5 (6.33)	17 (16.04)	24 (6.02)	32 (8.47)
Pulmonology	3 (3.80)	6 (5.66)	60 (15.04)	30 (7.94)
Infectious Diseases	5(6.33)	15 (14.15)	42 (10.53)	26 (6.88)
Orthopedics and Traumatology	2 (2.53)	3 (2.83)	15 (3.76)	21 (5.56)
Neurology	6 (7.59)	8 (7.55)	24 (6.02)	15 (3.97)
Anesthesiology and Reanimation	3 (3.80)	4 (3.77)	17 (4.26)	17 (4.50)
Brain and Neurosurgery	6 (7.59)	2 (1.89)	17 (4.26)	13 (3.44)
Other*	8 (10.13)	4 (3.77)	11 (2.76)	13 (3.44)

*Including Psychiatry, Urology, Cardiovascular Surgery, Thoracic Surgery, Plastic and Reconstructive Surgery, ENT, and Eye Diseases

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Table 4: Distribution by department consulted during the study periods.

	Period-I (n=227)	Period-II (n=283)	Period-III (n=821)	Period-IV (n=850)
Department from which consultations were requested	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Gynecology and Obstetrics	43 (18.94)	40 (14.13)	118 (14.37)	160 (18.80)
Internal Medicine	29 (12.77)	37 (13.07)	114 (13.88)	130 (15.28)
Cardiology	22 (9.69)	32 (11.30)	82 (9.98)	95 (11.16)
Orthopedics and Traumatology	20 (8.81)	15 (5.30)	79 (9.62)	81 (9.52)
Neurology	12 (5.28)	21 (7.42)	78 (9.50)	72 (8.46)
Eye Diseases	18 (7.92)	18 (6.36)	40 (4.87)	42 (4.94)
General Surgery	15 (6.60)	26 (9.18)	52 (6.33)	56 (6.58)
Pulmonology	9 (3.96)	17 (6.00)	77 (9.37)	40 (4.70)
Infectious Diseases	9 (3.96)	37 (13.07)	72 (8.76)	41 (4.82)
Brain and Neurosurgery	13 (5.72)	13 (4.59)	36 (4.38)	32 (3.76)
ENT	13 (5.72)	5 (1.76)	24 (2.92)	36 (4.23)
Anesthesiology and Reanimation	3 (1.32)	6 (2.12)	20 (2.43)	18 (2.12)
Other*	21 (9.25)	16 (5.65)	29 (3.53)	47 (5.52)

*Including Psychiatry, Urology, Cardiovascular Surgery, Thoracic Surgery, Plastic and Reconstructive Surgery, ENT, and Eye Diseases

The department from which consultations were most frequently requested from the emergency department was the Gynecology and Obstetrics department, followed by Internal Medicine and Cardiology (Table4).

DISCUSSION

As elsewhere in the world, the COVID-19 pandemic also impacted adversely the functioning of the health system in Turkey. Various restrictions were imposed in Turkey in order to emerge from the pandemic with as little damage as possible and to ensure the smooth operation of the health system. The present study investigated the effect of these restrictions on patient presentations to the emergency department in the early stage of the pandemic.

Studies have shown that patient presentations to the emergency department before and after the pandemic were affected differently (8-10). A study from Thailand reported a 36% decrease in patient presentations during the pandemic compared to the pre-pandemic period, and this decrease was observed in both internal diseases and traumatic cases. A study from Italy reported a significant decrease in emergency department presentations in the first months of the pandemic, and that cardiovascular system, endocrine system, and cancer-related out-of-hospital deaths increased (11).

Research in Turkey has reported similar findings, with a 53% decrease in emergency department presentations being reported during the pandemic compared to before it (12). Although patient presentations to the emergency department were not compared to previous periods in the present study, daily presentations decreased. This is closely related to the restriction decisions taken. Ordinary citizens modified their lifestyles after the restriction decisions, and this in turn affected the patient characteristics, diagnosis, consultations, and hospitalizations.

One of the most striking characteristics of emergency department presentations during the pandemic is perhaps the change in trauma patient admissions. Data from the literature show that trauma-related hospital presentations decreased during the pandemic (9,13). However, the mechanisms responsible for traumas changed, and since fewer journeys by vehicle were made in the wake of the restrictions imposed, trauma mechanisms such as traffic accidents also decreased (14,15). However, despite this decrease in traffic accidents, violence-related injuries increased. Hsu et al. reported a 5% decrease in domesti violence during the pandemic, while a study from the USA showed an increase in firearms injuries and penetrating object injuries during the pandemic (16,17).

In the present research, consistent with other research, traumas were one of the principal causes of emergency department presentations. In addition, at the onset of the pandemic sharp object and firearm injury rates were very low, although such injuries increased as the pandemic progressed. The decrease in violence-related injuries at the beginning of the pandemic may be attributable to the closure of places of entertainment where alcohol is consumed (such as bars and nightclubs) due to the restrictions imposed. The increase in violence-related injuries in the subsequent periods of the pandemic may derive from the loss of employment and income resulting from the pandemic, and mental pressure caused by food insecurity and social

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isolation. However, almost no decrease was observed in the rate of presentations to the emergency due to traffic accidents in the present study, remaining at notable levels throughout the pandemic. We think that this is due to the province of Kırıkkale, where the study was conducted, being an important junction between several provinces.

The pandemic affected the distribution of diagnoses, not only for trauma patients, but also internal diseases emergencies. Studies have shown a general decrease in all medical diagnoses made in the emergency department during the pandemic, while in a study from Italy, Giamello et al. reported that the internal medicine emergencies most frequently observed during the pandemic were disease associated infections (18-20). Another study compared emergency department presentations in the early part of the pandemic with the equivalent period one year earlier, and reported an increase in respiratory and cardiovascular system diseases, and decreases in abdominal pain, gastrointestinal system diseases, and musculoskeletal diseases (21). The data in the literature show that the pandemic altered not only the diagnostic characteristic, but also the rates of hospitalized patients (22-25). Another study reported a significant increase in hospitalizations in the Pulmonology, Infectious Diseases, and Cardiology departments during the pandemic (26). In the present study, diagnoses involving infectious diseases, (particularly gastrointestinal problems) and cardiology among the internal emergencies were most prominent.

This is consistent with the findings of previous studies. A similar situation was observed in terms of patient hospitalizations, the departments most frequently receiving hospitalizations being the Internal Medicine and Cardiology department, together with the Gynecology and Obstetrics department. Greater admissions to the Internal Medicine's clinic may be associated with people's fear of being infected with COVID-19. This is particularly frequent among elderly patients with chronic disease. These patients delayed routine checks during the pandemic and only presented to the hospital when their general conditions worsened considerably. In addition, during the pandemic the hospital administration decided to reduce the burden on the emergency department by decreeing that 'patients with suspected COVID-19 and with additional disease will be admitted to the Internal Medicine clinic until their test results are confirmed and this also increased hospitalizations to the Internal Medicine department.

Nearly all the patients hospitalized in the Gynecology and Obstetrics department were admitted for delivery, and it appears that the restrictions imposed during the pandemic had no effect on presentation and/or hospitalized women on the part of pregnant women. Although hospitalizations among cardiology patients decreased visibly at the beginning of the pandemic, they increased subsequently. This initial decrease may derive from patients being reluctant to present to a hospital due to fear of infection by COVID-19 or from the consensus report published by the Turkish Cardiology Society on 27 March 2020 (27). This consensus report may have caused cardiologists to relegate angiography procedures performed in close contact with the patient to a secondary position due to fear of infection with COVID-19 or to be hesitant about hospitalization, even for brief durations. In addition, some cardiology patients presenting with respiratory problems, particularly in the early part of the study period, may have been admitted to clinics other than cardiology on suspicion of infection with COVID-19.

The results of this study show that the pandemic affected the characteristics of patients presenting to the emergency department. Injuries resulting from violent trauma mechanisms, such as sharp object and forearm injuries, became more common as the pandemic continued. Presentations to due internal emergencies focused on Infectious Diseases, Internal Medicine, and Cardiology clinics, and admission rates were determined by decisions taken by hospital administrators or medical associations. Pregnant women represent a distinct patient group, and the pandemic did not prevent these from accessing the emergency department during the birth process. Health system administrators should make the requisite preparations and always be in a state of readiness, particularly in terms of specific patient groups presenting to the emergency department in case of pandemics and similar disasters.

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Ethics Committee Approval: Kırıkkale University Faculty of Medicine ; Research Board and Clinical Research Ethics Committee, date: 10.06.2021, Decision no: 2021.05.03

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